RESEARCH PLAN PROPOSAL

Mapping Quality Performance: In Search of Excellence of

Apparel Industry in Jaipur

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INTRODUCTION

In recent world trade, developing countries have gained a significant market share in textiles and apparel exports. In the context of textiles and apparel manufacturing, developing nations have advantages in resources and abilities to produce the goods on a broader scale at low costs and respond quickly to fashion changes. Accordingly, the textiles and apparel export industry has become a major contributor of economic growth for developing countries.

The dismantling of the quota regime represents both an opportunity as well as a threat. An opportunity because markets will no longer be restricted; a threat because markets will no longer be guaranteed by quotas, and even the domestic market will be open to competition.

Elimination of global textile and apparel trade January 2005 has brought about a dramatic shift in the world market for textiles and apparel products. This puts the Indian textile industry at the crossroads as the new order will throw up immense opportunities as well as challenges.

The Indian garment industry is exhibiting significant growth potential in the global market with its advantages in low production costs, abundant resources of raw material, and unskilled / skilled labor forces. The textiles and apparel industry is India's second largest industry, and India's largest exporter of manufactured goods. However, with an increased level of competition from low cost manufacturers around the world like China, Vietnam,Mexico, South Korea and South Africa, the industry is under tremendous pressure to increase productivity, to improve performance, to improve production quality,

and to advance the management systems. Furthermore, competition is much more intense in the textiles and apparel exports business after the quota cancellation. Therefore, it became crucial for garment manufacturers to respond to the new challenges with new strategies and solutions. In the intensified competition in the global market, it became important for manufacturers to thrive, to gain sustainable competitive advantage by innovations in technology or concepts as well as in production. All textile and clothing products are traded internationally without quota-restrictions, this impending reality brings the issue of competitiveness. It is imperative to understand the true competitiveness of Indian textile and clothing firms in order to make an assessment of what lies ahead.

Over the last few years, the United States & European countries have significantly increased their imports for prêt-a-porter garments (ready to wear). This change in the end users buying patterns means that the industry will have to quickly move up the value chain. Thus, the Indian textile and garment industry must address both demand and supply issues. The demand issues that the industry faces are:

- Understanding the change in buyer preferences.
- Keeping up with fashion trends.
- Competeting on non price factors.
- Upgrading technology to improve quality and productivity

From above issues, in all over the world demand and expectation of good quality is increasing day by day, quality is no longer a competitive advantage, but it is becoming a

sheer necessity to survive in the global market (Mehta,1998). In order to design and manufacture quality products, quality must be managed, and in order to effective management of quality, it must be clearly understood why it is important and how it will be achieved? Quality means performance, conditions and properties, has an important role to play in the competitiveness of the apparel export industry. As per a study by the US importers of Textile and Apparel (USITA), consistent quality was the top most criterion used to decide where to place import orders. This was followed by speed to market, low cost, product development capabilities and social compliance. In this regard following are the agreed benchmark parameters from the respective technical fields:

- Production per machine per shift
- Marker efficiency
- Defects percentage
- B-Quality
- Production moving system
- Standard minute value
- On time delivery
- Turnover
- Absenteeism
- Safety & House keeping
- Preventive maintenance
- Machine per technician
- Spare part control
- Numbering system to machine
- Machine attachment control

Despite of this fact Indian garment manufacturing industry always missed as when it comes to Quality. So it is now essential to bring dynamism in this sector by taking some realistic steps. If quality is managed effectively, the quality of each process is high and very little time and effort has to be spent on repairing and reworking faults. It can be

managed effectively by setting clear expectations throughout the firm in the form of quality and workmanship specifications. It can be done by inspection, data collection and analysis of this data. It is very important and essential to identify and listing the quality/workmanship standards.

According to Garvin(1984), a Harvard expert on quality, there are eight dimensions of quality: performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality.

For a garment to be fit for use, provided that the style is acceptable it must be:

• Free from defects such as stains, fabric defects, open seams, untrimmed threads, misaligned buttons and buttonholes and defective zippers.

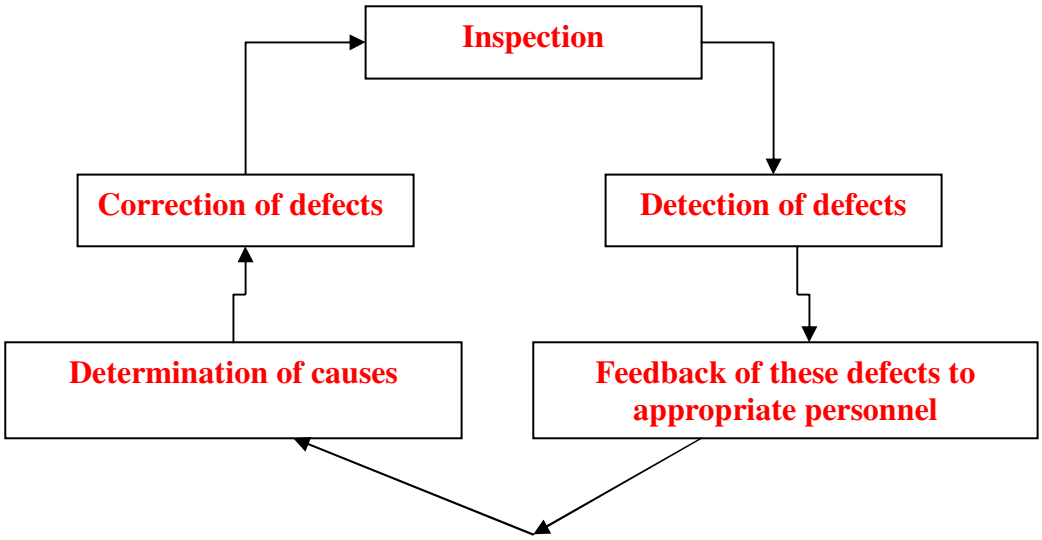
• Fit properly for the labeled size.

• Perform satisfactory in normal use, meaning that a garment must be able to withstand normal laundering, dry-cleaning, pressing cycles without color loss or shrinkage. Seams must not come apart and fabric must not tear.

Inspection also has key role in the process of quality control. The principle involved in the inspection is the early detection of defects, feedback of this information to appropriate people, and determination of the cause and correction of the problem. Inspection can be done at different manufacturing stages;

- Raw material inspection
- In-process inspection
- Final inspection

Inspection Process



Another important aspect of mapping quality is Testing. It has vital role in quality management because it helps to identify problem areas. There are following standard test methods are used for textiles:

- American Society for Testing and Materials (ASTM)
- American Association of Textile Chemists & Colorists (AATCC)
- International Standards Organization (ISO)
- Bureau of Indian Standards (BSI)

There is an urgent need to apply or strengthen the existing quality system in the apparel manufacturing units. Right now mostly organizations put more effort on defect detection prior to the dispatch of shipment rather than defect prevention. The growing international competition has put a lot of pressure on the apparel manufacturers to produce quality products at competitive prices and deliver them to the customer just-in-time.

It has to incorporate all the resources and services in the most effective manner and be sustained until the continuous improvement is inculcated in the workforce.

Quality is regarded as a technical issue managed by the quality department. Because of poor management commitment on quality, most of the garment industries don't have a culture to support total employees involvement in quality improvement. Thus quality vision, mission, documentation systems and relative measures do not exist.

Quality also depends on the management as well as on its employees. Organization that strives to fulfill its social responsibility, should provide its employees with safe working conditions, fair policies regarding appointment and remuneration and ethical workplace standards. There is no bias towards age, gender, color or marital status in its employee policies.

Corporate Social Responsibility (CSR) has become an issue of increasing importance in regard to outsourcing by developed countries of low-tech, labor intensive production to developing countries.

CSR can be an initial capital rather than cost, and "doing well by doing good" also exists in labour intensive industry. Social responsibility has become an issue of increasing importance in regard to outsourcing by developed countries of low-tech, labor intensive production to developing countries. Thus, CSR implies the claim that such outsourcing should not only be profitable, but also ethically accountable.

The major purpose of the study to assess the quality issues, increase productivity, improve product quality and manufacturing cycle time, reduce inventory, reduce lead time, and eliminate manufacturing faults and various social issues. A study (Sohal, 1996)

indicates that “most western manufacturers have been aware of the need to improve their performance and competitiveness for nearly two decades.”

So in this regard being the developing industry, there is a need to rework at the” basics” so that quality can be maintained. The present study is an initiative in this direction.

REVIEW OF LITERATURE

Quality plays an important role in the competitiveness of an industry. Western apparel industry has given importance to quality improvement from 1950's to 1980's. This was mainly done with the objective of reducing the manufacturing cost of apparel produced in the western world to counter the influx of apparel imports from the low labour cost countries of Asia. The research reports brought out by various trade associations representing apparel manufacturers in the Western World, demonstrate the productivity bench marking efforts leading to a substantial reduction in the labour content of apparel products (Bheda, 2003).

The research and development efforts of the Western industry have not only brought out the quality and productivity improvement potential available for the industry, but also provided following vital recommendations for productivity improvement :

- Use of modern equipments
- Improved methods
- Selection of better talent and training of employees at all levels
- Introduction of incentive and other motivational measures
- Increased use of work aids
- Initiation of inter-firm comparison (Bheda, 2003)

In spite of international competition, Indian apparel industry has been able to improve its export performances over the years. The domestic market for apparel in India is growing

at a steady pace. With the opening up of the Indian market and the removal of quotas from January, 2005 the Indian apparel industry faces immense competition in both export as well as domestic market. Trade blocks, preferential trading arrangements, non-tariff barriers and impact of new trends will affect Indian apparel industry. In such a scenario, competitiveness of the industry has become most important. McKinsey (2001) and Bheda and Shanbhag (1999) have identified low productivity as one of the major stumbling block in improving the competitiveness of the Industry. It is clear that the Indian apparel industry will need to improve its performance on productivity, quality, lead time, technology up gradation and creating an efficient domestic apparel retail sector to be able to compete successfully in the global market .

GARMENT INDUSTRY AND PRODUCTIVITY

The quota free era will bring in pricing, quality and delivery pressures. Cutting costs, reducing lead times and improving efficiency is the need for hour. What is needed is the right product at the right price, right quality and right time, which can be achieved by cutting fabric costs which is 91% in the cutting room. One can save 1 to 5% fabric costs and margins can move up from 104 to 120%. This can be achieved through right fabric, pattern engineering, seam allowance, right size, efficient markers, spread planning, cutting with zero gap, manpower and optimum blocking (Simon and Ashok ,2004).

Achieving competitiveness, the sourcing objectives should be to reduce merchandise cost, structure timelines and achieve flexibility of supply chain. According to them, cost, speed, plant efficiencies, productivity, supply chain, compliance, reliability and relationships are important. The present market conditions are tough with price near,

deflationary price trends, and highly sophisticated customer operating in a quota free era. According to Raza (2004), India is favoured of easy availability of raw material, robust textile industry, vertical integration at low costs, a sound manufacturing set up, flexibility of supply chain, skilled labour and software design. The suppliers are not in control because fabrics, trims, accessories, packing, testing, even hangers, cleaning agents and freight forwards are designated by the buyers. Continuous tweaking of the process and adding value at each level is needed along with improved quality. Rejections, delay and address supply chain needs of communication, reliability transparency and logistic cost.

The re-training of labour to achieve the desired increase in labour productivity is necessary. To keep pace with technology development and to save on operating costs and speed-up production, a change in layout plan is necessary to ensure smooth and quick passage from one operation to another to improve productivity. Panthaki (2004) viewed that by improving productivity by 25% i.e. from 2 pieces / mc / day to 15 pieces / mc / day. India's foreign exchange earnings would swell to 6.97 billion dollar. This fact merely emphasizes the scope for improvement with the existing machines.

Productivity is an important issue in well managed and poorly managed factories. The inputs show that how productivity performance can change between a poorly managed and well managed manufacturing unit. This change was mainly caused by factors like absenteeism, hours and performance on and off incentive and rejection level. From a workforce of 140 bodies working at 48 hours a week, the well managed factory could produce 21,522 garments as compared to 14,636 garments only by a poorly managed factory. The resultant productivity works out to be 25.62 garments per operator per shift in the former case and 17.2 garments per operator per shift in the later case.

Evolution of Quality

Mehta (1992) brings out the realization of the importance of quality among the American industry. He reported in a Business Week Special Report (1987) that in most of the US industries cost is probably the biggest item on their list of expenses, and it is always bigger than gross profit. However, because the cost of quality is rarely broken out in gory detail, management has no idea of its true dimension. When quality audit are performed, they invariably uncover huge "hidden plants" staffed and equipped to find the defective products. The typical factory invests a staggering 20% to 25% of its operating budget in finding and fixing mistakes. As many as one quarter of all factory hands does not produce anything they just rework things, which do not work right, the first time. Add in the expense of repairing or replacing the flawed products that slip out of the factory in the market and the total burden of "un-quality" can mount to punishing 30% or more of production costs.

The multi-dimensionality of the concepts quality and aesthetics are strongly emphasized. Researchers add that since the physical properties influence the performance characteristics, consumer select apparel products because that they believe it will then bring about the desired performance. (Helena,2004)

Bheda (2001) has done a comprehensive research study on 'productivity in Indian Apparel industry: Paradigms and Paragons'. The scope of study was limited to the Indian manufacturers of woven shirts and blouse using assembly line system of production. The study has investigated various aspects of apparel productivity namely :

a. Perception of manufacturers on their own productivity levels. The performance perception of apparel productivity varied a lot in the Indian industry. Compared to the average productivity being 100%, the manufacturers rated their productivity levels as low as 45% and high as 150%. This indicates that the top most performance could be as high as three times the lowest productivity.

b. Estimation of Productivity level for specified shirts styles- The style wise productivity estimate could serve as an important reference point to manufacturers for comparing their own estimate or actual productivity data for a similar product.

c. Perception of world standard for shirt productivity – The industries perception of world standard productivity level for a shirt manufacturer varied a lot from factory to factory. The highest standard was 38 shirts per machine / operator per shift, whereas the lowest was 8 shirts per machine / operator per shift. The gap between the lowest and the highest estimate of excellent performance clearly signals the significant difference in the exposure level of the industry to excellent performance. According to him, world standard is much higher than the average productivity achieved by the Indian apparel manufacturers. It also indicates the growing awareness among manufacturers who catch up in terms of productivity performance.

d. Actual productivity performance – for a computing actual productivity, data was analyzed using a database of time standards developed with the

help of General Sewing Data (GSD), a Method Time Measurement (MTN) based system for apparel industry. This provided standard Allowed Minute (SAM) values for these styles. SAM values of different shirt / blouse style were used to compute the productivity performance of the factories in terms of Standard Equivalent Unit.

Modern sewing structure dramatic changes have been done to derive maximum benefit for production. Through development of some extra department with very less manpower and cost, a camp, a company may be able to increase cost competitiveness by enhancing productivity and quality of goods. (Sharma, 2007)

Quality Control and assurance

Roy and Mehta (2004) suggested views on quality assurance in garment manufacturing. They ensured that garment manufacturing involves managing the material, process and people at every stage of operation so that the final product confirms in design, properties and prices to the satisfaction of the customer. Thus, the aim of any quality system in the context of garment manufacturing is to ensure minimum practicable cost, that the requisite quality of the product is being achieved at every stage of manufacturing from raw material to boxed state.

Kaur (2004) conducted a study on quality procedures for raw material. Her study reveals that the selection of raw material vendor is mainly done based on the prior contact with the vendor. Around 90 percent of the manufacturers inspect the quality procedures followed by the supply before placing an order. The faulty raw materials are returned by almost all the manufacturers where as only 2 percent make it a point to accept only the zero defect rate fabric. The maximum emphasis while inspecting fabric is laid on fabric

width. Around 95 percent manufacturers check the color matching and quality of trims. The 4-point system is used for judging the fabric quality and rejection rate is highest at 66 percent when the defect rates fall in the range of 20-40. She concluded that quality means fitness for use, conformance to specification and fulfilling the customer requirements. Quality procedures followed at the raw material level should be studied because quality of the final product is on the raw material quality.

Turan (2007) said in his study that with the intensifying competition, and putting the concept of 'total quality' into practice, it appears that firms which function according to the concept of 'acceptable quality level' (AQL) have no other choice but to adopt a 'zero defect' (ZD) policy. The perception of AQL is replaced by the perception of '100% quality' or 'ZD'. In the past, customers would accept goods with 1%, 2%, or even 5% defects; today they satisfy their needs with companies whose production error levels are measured in ppm (parts per million), ppb (parts per billion) or ultimately ZD. To guarantee 100% quality through examination is impossible. Therefore, manufacturers are increasingly abandoning the control of products, preferring instead to control the system producing that product.

No plan is ever perfect, but all that we have learned about total quality management reminds us that we must aim at the ideal rather than settle for 'Acceptable Quality Levels'(AQL) that have a built-in failure rate. Production efficiency depends upon this. In the clothing industry, planning will typically focus on sewing, as it can account for up to 80% of the skill and resources required (Collins and Sarah,2004).

Businesses all over the world are now facing fierce competition because of liberalization of trade and globalization. Foreign competition has penetrated into almost all the

industries, both in the production and service sectors. There prevails a view that organizations in Europe, Japan and the several developing countries are seizing the initiative in a dozen key technologies, including factory, automation, consumer electronics, microchips and aerospace. Many countries are emerging as strong competitors and challenges for those who have already been industrially developed (Mannan and Ferdousi, 2007).

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Kaur (2007) in her article in Manufacturing Technology in the Apparel industry discusses that the manufacturing technology in the apparel industry varies from totally manual to fully computerized operation. Most of the work in the industry is still being carried out, thus proving it to be a labour intensive industry due to the cheap availability of labour. To improve it, a checklist must be made for every important step, which is required before a bulk production of any apparel design.

Quality Standards

Quality standards are frameworks for achieving a recognized level of quality within an organization. Achievement of a quality standard demonstrates that an organization has met the requirements laid out by a certifying body. There are at least four different sources of product standards: company standards, industry standards, national standards, and international standards.(Mehta 2005).

Generally garment industries view ISO certification is only necessary as a factor for exports. Implementation of ISO helps the garment industries to enhance their product and process quality, minimizes defective supplies and reworking. As it is a well recognized standard for quality, it shows the customers that the industry takes quality seriously. ISO certified companies focus more on the quality of their products and operations. It also motivates the employees in improving quality. The cost of implementing ISO is comparatively cheaper to the benefits derived out of it. Many ISO certified companies positively assert that their total costs went down to a considerable extent after the implementation of ISO.

Alagulakshmi et.al, (2008) says that Quality Standards like AATCC, ASTM, BS, DIN, JIS and ISO must be recognized and agreed by all levels of Management. In the absence of such agreement the operater does not know what is expected of him or her, becomes frustrated, and leaves with the ensuing needlessly high labour-turnover and training costs of new labour.

Mehta, (2006) says that quality problems are generally a combination of both management and worker-cause. Traditional quality improvement efforts after under

estimate the importance of human behaviour. Therefore, workers must have understanding of the consequences of the behaviour that result in poor quality work.

Clemson Apparel Research, (2008) reveals that the implementation of unit production systems as a percentage of total sewing capacity varies from a low of 9% of total capacity to a high of 92% unit production; system produces for improved efficiency by dominating highly in productive material handling procedures.

As stated by Narain and Yadav (2004), "Since the advent of economic liberalization in the early nineties the manufacturing scene in India has witnessed major upheavals. Reeling under the heavy burden of stiff international competition, Indian manufacturers throughout the country has now begun to place grater reliance on their own strengths to harness the latest technologies available and to pursue the best management practices followed elsewhere in the world in an attempt to become lean and agile".

Shivendra et al, (2008) finds that the perceived quality of a garment is the result of a number of aspects, which together help achieve the desired level of satisfaction for the customer. To fulfill these requirements, making use of the emerging technology and well trained worker to give best output and complete planning before the production to give the best result for the company and for the country's income and profit.

Through the implementation of performance improvement processes in the garment sector can reduce costs, as well as increase quality, customer responsiveness through reducing several types of waste from the production process. Customers demand quality products and on-time delivery. These practices can fulfill these requirements by reducing lead-time as well as manufacturing cycle time. Now, many countries have started to practice these tools in the garment industry and observed tremendous improvement

(Mazany, 1995; Bruce et.al; 2004). This practice has improved their productivity, quality and lead-time and also made their customer more responsive. In addition to this it involves, motivates and develop employee skills through education and multi-skilling program (Mazany, 1995).

Shanmugasundaram (2010) finds in his study that the lack of quality consciousness and awareness in the knitwear industries in Tirupur and also unawareness exists in the different levels of management. The yarn of inferior quality are chosen due to the cost factor at the initial stage itself without compromising the quality aspects. Though the manual knitting has become completely obsolete in the knitwear industries in Tirupur, most of the units use indigenous machineries for their knitting in performance. As a result, the fabrics became much inferior in quality and also resulted in large wastages. Due to want of time and mounted over pressure and urge for executing out the order on time, most of the manufacturers fail to check the quality of the fabrics at the initial stage itself. Due to this factor inferior quality fabric goes for the next stage of further processing and finishing which causes unwanted processing cost increasing the total value of the piece.

Quality is ultimately a question of customer satisfaction. Good Quality increases the value of a product or service, establishes brand name, and builds up good reputation for the garment exporter, which in turn results into consumer satisfaction, high sales and foreign exchange for the country. The perceived quality of a garment is the result of a number of aspects, which together help achieve the desired level of satisfaction for the customer. Therefore quality control in terms of garment, pre-sales service, post-sales

service, delivery, pricing, etc are essential for any garment exporter (Gaurav Doshi, 2006).

For textile and apparel industry product quality is calculated in terms of quality and standard of fibres, yarns,fabric construction, colour fastness, surface designs and the final finished garment products. The quality is testing as an instrument for process improvement and quality up gradation (Nadiger, 2001).

There are a number of factors on which quality fitness of garment industry is based such as -performance, reliability, durability, visual and perceived quality of the garment. The latest developments in processing of knitted fabric and the benefits of technologies in improving the quality of product (Edwyn Rodrigues, 2000).

Reddy (2002) attempted an analysis and said that quality needs to be defined in terms of a particular frame¬work of cost. The national regulatory quality certification and international quality programmes like ISO 9000 series lay down the broad quality parameters based on which companies maintain the export quality in the garment and apparel industry. of SWOTs of Indian textiles and clothing industries and the requirements for quality, environment and social responsibility standards and suggested a strategy towards global competitiveness. It was focused how the companies can achieve operational efficiency and profitability by the way of implementation of standards like ISO 9000, ISO 14000 and SA 8000. Quality is ultimately a question of customer satisfaction.

Textile Testing

Das, (2008) stated that assurance of international standards, product innovation and adaptability to changing tastes of consumers are some of the areas of current interest.

Today's consumers are redefining value to include reliability of the product performance-they are asking whether product is assured in actual use or not. Apart from dimensional stability ,colour fastness to washing and drycleaning as well as chlorine and non-chlorine bleach are important parameters to verify. The performance of any kind of apparel can be characterized through various physical parameters. In the apparel industry tear, bursting and seam properties. Das concluded that in order to meet changing requirements, and to provide an objective framework for what is acceptable in export to different destinations, quality characterization of apparels has continuously been attracted attention.

Mandal and Abraham, (2010) concluded in his study that sewing thread have great impact on seam quality and have significance on seam serviceability and seam appearance. The findings show that sewing threads properties impart significant influence on the area of seam quality for high consumer satisfaction. The practical implications include consumer satisfaction is based on the significance of sewing thread for seam quality is an important for quality control required by the apparel manufacturers and their customers. He concluded that knowledge of the relation between sewing thread mechanical properties and seam quality is essential for apparel manufacturer for prediction of sewing thread mechanical properties, as related to the required properties of high seam quality. By defining the relation between seam qualities and sewing thread mechanical properties, apparel manufacturer can make decision about the optimal sewing thread selection in apparel manufacturing.

Anand, (2002) researched on the dimensional stability of knitted cotton goods.The main aim of this work was to systematically investigate the effect of the principal washing and drying variables on the dimensional stability and distortion of knitted fabrics. The work

demonstrated that changes occurring after laundering were largely due to alterations in the loop shape, rather than yarn or loop length shrinkage. The fabrics had taken up their fully relaxed dimensions after five wash and dry cycles and appropriate conditions for laundering had been applied, as no significant yarn stitch length or linear density changes occurred. The work demonstrated that changes occurring after laundering were largely caused due to the agitation during tumble drying.The agitation was found to have caused 34% of the changes during laundering, followed by the spin cycle during washing, which caused 24% of the dimensional changes and distortion.

Three most frequently used self-assessment models have been Japan's Deming Application Prize, the Malcolm Baldrige National Quality Award (MBNA), and the European Quality Award (EQA). Each award is based on a perceived model of total quality management. They do not focus solely on either product or service perfection or traditional quality management methods, but consider a wide range of management activities, behavior and processes which influence the quality of the final offerings.

The model of the European Quality Award is divided into two parts: enablers and results. The enablers are leadership, people management, policy and strategy, resources and processes. These five aspects steer the business and facilitate the transformation of inputs to outputs. The results are people satisfaction, customer satisfaction, impact on society and business results which are the measure of the level of output attained by the organization. The model consists of nine primary elements which are further divided into a number of secondary elements.

Falck and Heblich (2007), show that by practicing CSR strategically, a company can 'do well by doing good'; in other words, it can make a profit and make the world a better

place at the same time. CSR is regarded as voluntary corporate commitment to exceed the explicit and implicit obligations imposed on a company by society's expectations of conventional corporate behavior. Companies can support this procedure and in doing so, gain profits at the same time.

CSR can be considered an efficient management strategy, and can be a crucial factor in the company's success. The practice of CSR is an investment in the company's future. Used well, it is a way of actively contributing to the society's basic need and, in doing so, enhancing the company's reputation. From a supply-side perspective, a good reputation is necessary to attract, retain, and motivate quality employees. From a demand-side perspective, a good reputation increases the value of the brand, which, in turn, increases the company's goodwill. So, CSR can be much more than just a cost, constraint, or charitable deed.

Approached strategically, it can be a source of opportunity, innovation, and competitive advantage. CSR strategy has an significant impact on the competitiveness of the firm.

BROAD PROFILE OF THE STUDY

Quality is no longer a competitive advantage, but it is becoming a sheer necessity to survive in the market. The case for promoting the Indian apparel industry is strong given that it accounts for 4% of country's gross domestic product and one fourth of its export earnings besides being the single largest employer with an estimated workforce of 35 million.

The purpose of the study is to improve the quality management system of the country to be accepted at international level, increase awareness on international quality standards and potential for exports. The Quality Component will focus on the improvement of the quality, standards, metrology and accreditation system in the country at an international level. This will enable Jaipur apparel industry to address challenges and requirements as well as to increase the competitiveness of its export industry.

This is required as the upgrading of quality in industry is dependent on the reference standards it utilizes and also the method used to manage and assure quality during production.

The Indian apparel industry shows much lower quality performance. Indian apparel industry need to improve its performance keeping in view the above aspect, hence the need arises to document the various related problems.

Henceforth this study is design to determine the current quality management practices as well as how industries can adopt new methods to improve their quality standards that will open new profit zones. Aside from quality of fabric, other factors also have effect on the quality of garments.

This study is proposed to identify the following objectives:

- **To study the current quality control practices adopted by the apparel manufacturers in Jaipur city.**
- **To assess the physical parameters such as colour fastness, dimensional stability, seam and stretch properties related to the workmanship and quality of the garment as recommended by ISO.**
- **To analyse and compare the quality standards recommended by ISO and practices in apparel industries.**
- **To identify the management controllable quality problems and employee controllable quality problems.**
- **To explore the role of Corporate Social Responsibility (CSR).**

Hypothesis:

H1 : Apparel industries of Jaipur are not following all the ISO parameters recommended for it.

H2 : Management controllable quality related issues do not affect the overall productivity of the unit.

Limitations of the study:

1. The study will be confined only for apparel export houses of Jaipur.
2. To obtain the in-depth information, number of units taken will be limited to 90 units.
3. For physical testing of garment only ladies garments will be undertaken.
4. Only woven cotton garments will be taken as sample for the study.

METHODOLOGY

Methodology is a scientific way of conducting research in order that a study is reliable and conducted with accuracy. The study will be carried out by collecting data on the quality standards, workmanship specifications and performance of the export house through surveys. The study will be carried out to establish the main variables influencing the export houses competitiveness in terms of their quality performance.

The study will use both primary and secondary data. But mostly it will be based on primary data collected through questionnaires and interview schedule of middle management and top management officials and other levels of management.

Strategically random sampling method will be used for selecting samples .The methodology adopted is a scientific and objective one without any personal bias.

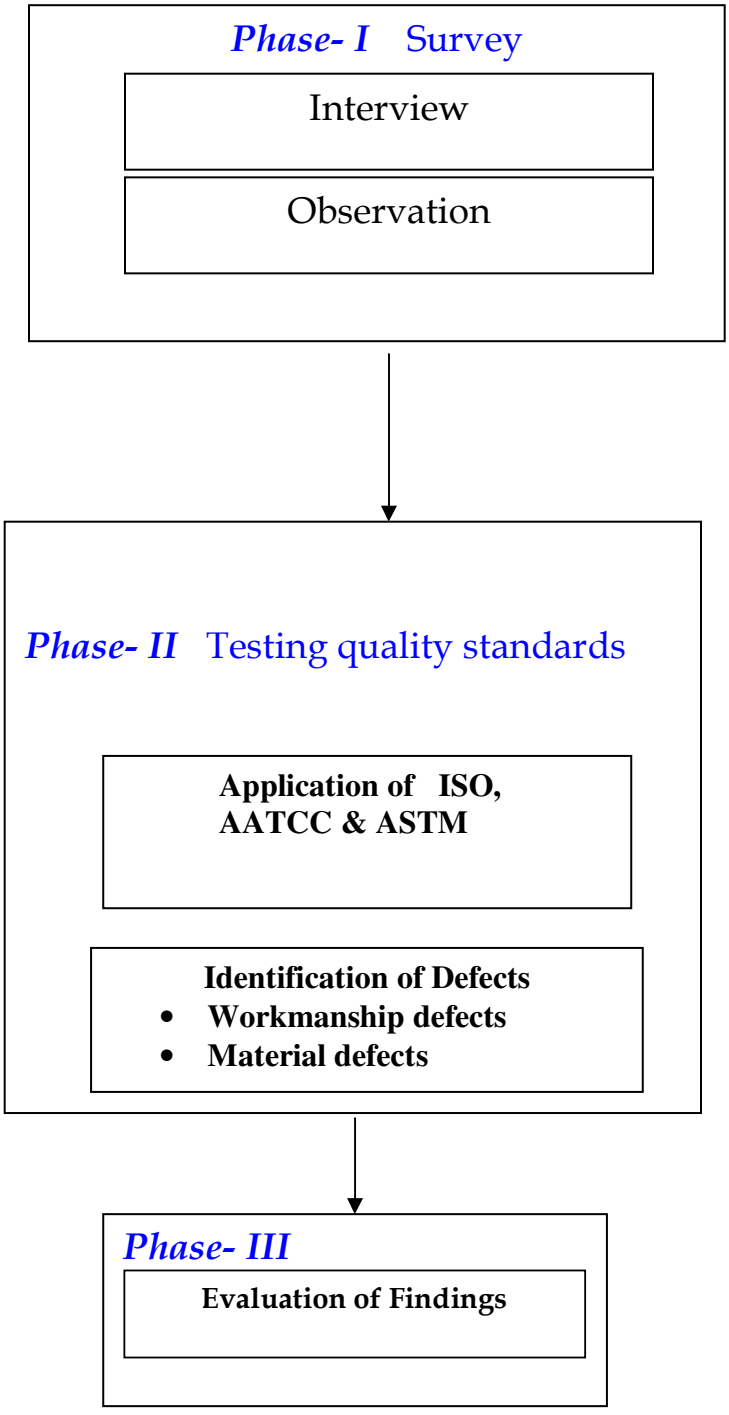
Keeping the objectives in mind the study will be carried in following phases-

Phase- I Survey (Interview and Observation schedule)

Phase- II Testing quality standards

Phase III Evaluation of findings

Work Process



Methods and Instruments

Survey (Interview schedule)

In phase I the following methodology will be undertaken for the collection of data with the objective of the study:

1. **Locale of the study**

2. **Selection of the sample**

3. **Selection of the method**

4. **Development of research tool**

1. Locale of the Study

The locale of the present study will be confined to the apparel export houses in Jaipur city.

2. Selection of the Sample

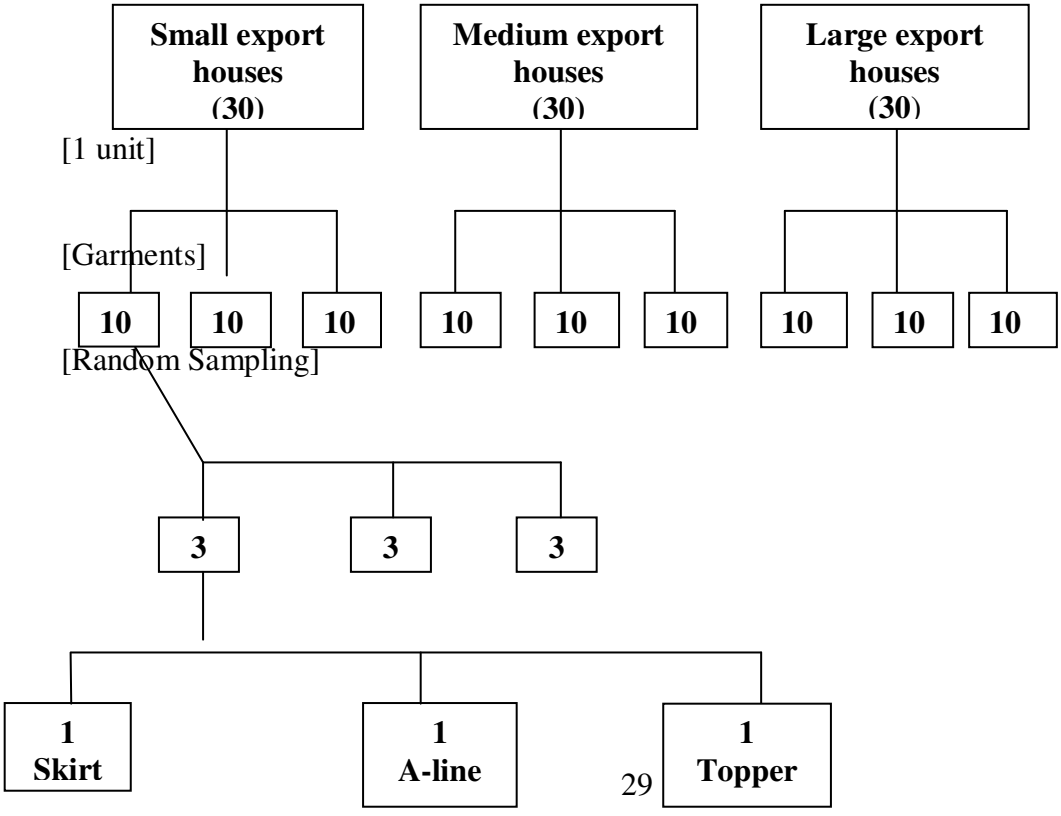
The sample population for the survey will consist of 30 apparel export houses from each category small, medium and large group, recommended by Export Promotion Council. The export houses will be selected on the basis of their turnover. A list will be obtained from Apparel Export Promotion Council of the export houses. The samples will be to select by random sampling method using lottery method.

Export houses of Jaipur are dealing with various types of fabric that includes mainly woven and knitted cotton, rayon, crepe, chiffon and georgette. Using these fabrics, a variety of garments are prepared like A-line dresses, upper garment-topper, kurtas, shirts, skirts etc(Source:AEPC). A few apparel houses are dealing with gents garments and kids wear. For the purpose of quality check and physical testing only woven ladies garments will be taken, which will include:

- A-line dress
- Topper
- Skirt

The garments for the study will be selected in following manner:

Selection of Sample for Testing



For sample selection for physical testing initially 10 garments from each garment type will be randomly selected the sample garment, from each group of export houses(small, medium and large). From 10 garments, 3 garments from each type will be again randomly selected. Finally for the purpose of testing 1 garment from each garment type will be taken.

To get the survey underway as rapidly as possible, all owners will be intimated at prior, so they can take the opportunity to be the part of the survey. The sample will be selected comprehensively in order to include the apparel manufacturing units functioning at varying technology levels.

3. Selection of Sampling Method

As the study regime in-depth information, therefore pre-testing will be done to get the details regarding the various aspects of the apparel-manufacturing units. The tool will be developed on the basis of pre-testing.The prime data for the pretesting will be collected through survey method. Thereafter to attain the purpose information two tools namely, Interview Schedule and Observation Schedule will be devloped. These particular methods give advantage of flexibility of data collection which gave the respondent an opportunity for clarification in case of doubt. Further it allowed the interviewer to ask the follow up questions.

4. Development of Research Instrument

The data collection will be done by interview schedule as indicated by presenting pilot testing. This is done due to the extremely poor response to the questionnaire method as reported by the earlier studies on Indian apparel industry. The interview schedule will be designed to get the data on the current quality performance of the factory, their perception of quality improvement potential, management strategies and suggestions for improvement.

The schedule will also attempt to get the data on the scale of operations, product-market orientation, human resource management practices, data on production and quality system and the technology level development.

- The schedule prepared will have the following sections:

Section-I : The first section dealt with general information of the industry. The questions will be relate current practices to maintain quality standards by the apparel manufacturers to the workers and their performance. This category of questions will be designed to explore the general quality awareness of the industries.

Section-II : The second section included information regarding the productivity of the unit. The questions will be on number of machines, number of operators, number of helpers, number of checkers, number of supervisors, duration of work shift, product sewn, average daily output etc. It will also include questions on various factors related to management and employee controllable problems. The questions of this category will be related to the causes of poor quality, rejection % in the factories. The objective of these

questions is to evaluate the impact of factors such as skills, technology, management commitment and supplier relation.

- **Section-III**: The third section will include the information relating to quality control. The questions will be based on process of inspection, packaging, labelling type of defects occur and quality procedures and practices. The questions will also be designed to assess the quality improvement efforts made by the management such as trainings, teamwork and customer satisfaction.

- **Section-IV**: The fourth section will include the information relating to management and employee controllable various factors and issues related to social accountability. This section will deal with quality performance to understand the current quality standards in garment industries. Questions will be framed to know about quality planning, quality design, quality control, quality improvement, quality assurance, quality documentation and cost of quality.

The respondents will be interviewed individually with the help of schedule. The questions will be verbally asked by the investigator herself and responses would be noted down in the interview schedule. The results will be coded, tabulated and analysed.

Besides interview schedule, quality assurance scale will be prepared for the purpose of Visual observations that include

- Raw Material Inspection

- In-process Inspection and
- Final Inspection

Phase II Testing quality standards

In the second phase of the study the quality of the fabric will be evaluated to study the physical parameter related to the workmanship and quality of the garment. The testing method related to ISO (International Standards organization) AATCC (American Association of Textile Chemists and Colourists) and ASTM (American Society for testing and Materials) will be taken for testing.

For testing purpose following test will be conducted, which are as per ISO standards:

- Colour Fastness properties
- Strength properties of apparel

a. Fabric Strength

b. Seam Strength

c. Resistance Strength

- Dimensional stability
- Other garment related which essentially requires for export garments (sewing threads, buttons, snap fasteners etc.)

Test method	**Fabric test**	**Instrument**
IS:766:1988	Rubbing fastness	Crockmeter
IS:2454:1985	Light fastness	Xenon light
IS:971:1983	Perspiration fastness	Perspirometer
IS:764:1979	Washing fastness	Launderometer
IS:665:1989	Dimensional stability	
IS:1969:1985	Tensile strength	Tensile strength tester

IS:13935	Seam Stability	
IS: 13936	Seam Slippage	

After conducting the physical tests, major defects will also be identified this occurs in the stage of final inspection. To identify defects, data will be collected in the process of final quality inspection, and type of defects will be identified for 8 weeks. Then performance will be compared in term of out put per day, number of defects and over all efficiency. The comparison will be calculated and compared statistically.

Apart these tests, packaging and labelling department will also be considered to check the appropriateness for the requirement, as Bheda,(2005) said that "Quality cannot be inspected in to the product it has to be produced right first time."

Phase III Evaluation of Findings

Analysis of data will be done through

a) **Processing of data**: The obtained data will be summarise by

- Coding
- Tabulating

b) Presentation of data: The coded and tabulated data will be presented in following manner:

- Percentage
- Frequency
- Tables
- Charts

- Flow charts
- Graphical presentation
- Descriptive analysis

The textile testing results will be evaluated using suitable statistical methods.

Usefullness of the study:

- Jaipur has a big contribution in garment exports, study will help in economic development.
- Study will also help to policy makers to review the current policies and to revise, if required.
- As study will deal with the issues of Corporate Social Responsibility that further will help the management and labours.
- Dealing with the issues of Corporate Social Responsibility,it will help to uplift the society.

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